U.S. ARMY TECHNICAL CENTER FOR EXPLOSIVES SAFETY

EXPLOSIVES SAFETY

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Highlights from the Upcoming Explosives Safety Policy for Real Property Containing Conventional Ordnance and Explosives (OE) (Draft)

(Editors Note: Most of the articles in the bulletin are in one way or another governed by the above policy, which is being finalized by the Army. The portions are taken from paragraphs 6 and 7, and give a brief overview of the policy's content and application. The policy is still in draft status, and should be reviewed in its entirety before making any attempt to apply it in any way.)

GENERAL

The policy, when finalized, will apply to real property containing conventional OE.

Real property may contain OE as the result of:

- Research, Development, Test and Evaluation (RDTE).
- Manufacturing .
- Storage.
- Weapons firing.
- Training.
- Open burn/open detonation (OB/OD) operations.
- Disposal.
- Loss.
- Waste collection.

Examples of such property include pads, pits, basins, ponds, streams, impact areas, maneuver areas, training areas, burial sites, and buildings used for OE activities.

Explosives safety is paramount in the management of real property containing OE. All OE planning and response actions must include participation of explosives safety technical personnel.

SCOPE

The policy applies to the following:

- Army real property containing OE.
- Formerly Used Defense Sites (FUDS) that contain OE, regardless of which Service used the site. The Army, as the Executive Agent for Department of Defense (DOD), is the lead authority for OE at all FUDS.

The policy does not apply to the following:

- Biological warfare materiel and chemical warfare materiel response activities which are addressed in Assistant Secretary of the Army (Installation Logistics and Environment) (ASA[IL&E]) memorandum, subject: Interim Guidance for Biological Warfare Materiel and Non-Stockpile Chemical Warfare Materiel Response Activities.
- Emergency response actions taken to abate an immediate, extremely high explosives hazard. Included are military explosives ordnance disposal (EOD) emergency responses, Technical Escort Unit (TEU) emergency responses, and emergency responses performed by U.S. Army Corps of Engineers (USACE) unexploded ordnance (UXO) contractors.

For example: An area that contains hazardous UXO on the ground surface is

discovered next to a playground, immediate action must be taken to deny access and/or clear the OE. Active installations have the authority to initiate emergency responses on their property. For FUDS, USACE has authority to act where permission to enter the property is first obtained from the current landowner.

- Range clearance operations conducted on active and inactive ranges.

- OE response actions conducted by an Army agency for Navy, Air Force, or Marine Corps customers. For these actions, the customer's explosives safety policies apply provided they are at least as protective as Army policy.

- Response actions for other types of materiels such as radioactive materiel that require special consideration beyond the scope of this guidance. Specific guidance can be obtained from the Army Safety Office.

by: Mr. Gary Abrisz
Assistant for Safety
Office of Deputy Assistant
Secretary of the Army for
Environment, Safety and
Occupational Health
DSN 227-0440
COMM 703-697-0440

DOD PROPOSED RANGE RULE

The DOD has developed a proposed Range Rule that identifies a process for initiating and conducting response actions on closed, transferred, and transferring military ranges. The regulation will address explosives safety, human health, and environmental concerns related to military munitions and other constituents on these ranges.

DOD is promulgating this regulation pursuant to authorities set forth in the Defense Environmental Restoration Program (DERP) (10 U.S.C. 2701-2707), Department of Defense Explosives Safety Board (DDESB) (10 U.S.C. 172), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601-9675).

This rule making is also based, in part, on the Environmental Protection Agency's (EPA's) proposed (60 Fed. Reg. 56468, 8 Nov 1995) and final Military Munitions Rule (62 Fed. Reg. 6622, 12 Feb 1997). In EPA's rule-making, EPA recognized DOD's legal authority to establish regulations for military ranges, as well as DOD's unique expertise in addressing the explosives safety risks inherent in military munitions. EPA stated in its proposed rule that the DOD rule must fully protect human health and the environment, and provide for public and regulatory involvement throughout the process. DOD believes it has met this challenge in the proposed Range Rule (62 Fed. Reg. 50795, 26 Sep 97) and looks forward to promulgation of a final Range Rule in 1998.

DOD is promulgating this regulation in accordance with the Administrative Procedures Act. It has sought to facilitate discussions with the public, regulators, and other federal agencies by publication of pre-proposal drafts. DOD published the proposed rule in the Federal Register in September 1997, and it includes a formal 90-day public comment period.

The proposed Range Rule sets forth a comprehensive process for identifying, evaluating, and addressing military munitions and constituents on closed, transferred, and transferring ranges. That process ensures not only public safety, but also the safety of response personnel, while addressing human health and environmental concerns. Important provisions of the proposal are summarized in the following pages.

DOD RANGE RULE OVERVIEW

The process for addressing closed, transferred, and transferring military ranges has five basic phases: Range Identification, Range Assessment/Accelerated Response, Range Evaluation/Site-Specific Response, Recurring Review, and Range Closeout.

Range Identification

Under the Range Rule, the DOD would identify all land and water closed, transferred, and transferring ranges subject to the rule. As defined in the proposed rule, a military range is any designated land or water area used for training with military munitions, or any area used for munitions research, development, test, and evaluation (RDTE).

The proposed Range Rule also defines the following categories of ranges:

Closed Range. A closed range is one that is taken out of service by the military and put to a new use that is not compatible with range activities. A range is considered closed, for example, when construction of buildings in that area have made it unsuitable for range use. Closed ranges are typically under the control of the military.

Transferred Range. A transferred range is one that has been released from military control. These areas are a subset of Formerly Used Defense Sites (FUDS). Some of these ranges have been transferred to other federal agencies such as the Department of Interior (DOI) or Department of Energy (DOE). Others have been transferred to state or local government, or to private citizens.

Transferring Range. A transferring range is a military range, or portions of a military range, that is being considered for transfer outside of military control. These include ranges under the DOD Base Realignment and Closure (BRAC) program, as well as other property transfer agreements. Transferring ranges remain under military control until they have been officially transferred to another party.

The proposed Range Rule does not address the management of military munitions or constituents on Active or Inactive Ranges. Active Ranges are those that are being used by the military for training or RDTE. An Inactive Range is one that is not currently being used, but is held in reserve by the DOD, in the event DOD has a change in mission that requires its use.

The management of active and inactive ranges comes under existing DOD and Service regulations. The proper safety-based management guidelines for unexploded ordnance (UXO) at active and inactive ranges will be addressed in a forthcoming policy to be issued by the Department of Defense Explosives Safety Board (DDESB).

During the Range Identification phase, detailed information about the ranges would be recorded in a centralized range tracking system. DOD would use this range inventory to assist in prioritizing ranges for subsequent response. For example, Transferred Ranges (those already outside of DOD control and in non-DOD use) would be addressed before Transferring or Closed Ranges, which are still within DOD's control. DOD will seek to ensure that a notice of the land's prior use as a military range is contained in official land records.

The Range Identification phase would also include public and state involvement in identifying the location of closed, transferred, or transferring military ranges. After verifying the accuracy of information received, DOD would enter the information into its central range tracking system.

DOD also plans to provide information on the identified ranges to federal agencies that develop and distribute official maps and charts.

Range Assessment/Accelerated Response

Range Assessment. Once a range has been identified, DOD would assess the explosives safety, human health, or environmental risks the range might pose. This assessment would include collection of existing information on such factors as soils and geology, terrain, vegetation, climate, current and predicted land use, and other data useful in assessing risk.

The Range Assessment would allow response personnel to distinguish between ranges where risks can be readily managed and those that warrant more detailed study and analysis. The Range Assessment may require a visual inspection of the range or some sampling of environmental media.

Accelerated Response. An Accelerated Response is any readily available, proven method of addressing the immediate risks, particularly explosives risks, posed by military munitions or other constituents on military ranges. When range conditions warrant a response, DOD would implement a readily available, proven method of addressing the immediate risk.

Some examples of Accelerated Responses include:

- Posting signs warning of danger associated with a range.
- Erecting fences or taking other measures to control access.
- Starting community education and awareness programs.
- Installing monitoring wells to determine if substances are in the groundwater.
- Conducting surface sweeps for unexploded rounds.

This is by no means a complete listing of the types of responses available to address the risks posed by ranges.

DOD would use information collected during the Range Assessment phase to determine which Accelerated Response measures are warranted. Additionally, information about the types of munitions used, reported incidents involving munitions, and information about the environmental setting of the range will also be helpful in assessing the risks and selecting an appropriate Accelerated Response.

The primary difference between this type of response and a more complex, site-specific response is the scope of the evaluation. Consultation with federal and state agencies and the public, and public access to information,

as well as a formal comment period, would play an important part in selecting an Accelerated Response or determining that a more in-depth Range Evaluation must occur.

Range Evaluation/Site-Specific Response

Range Evaluation. Range Evaluations are detailed investigations into the types of munitions used on the range, materials associated with these munitions, and the environmental setting. Information collected during this phase would be far more detailed than that collected during the Range Assessment.

The primary purpose of the Range Evaluation phase is to assess the level of risk posed by the site and make an informed risk management decision. The Range Evaluation would be used to determine whether a Site-Specific Response is required and to provide an estimate of the overall risk posed by the range conditions.

Site-Specific Response The Site-Specific Response evaluation examines various alternatives that address risks that have not been reduced or eliminated by responses taken earlier in this process. Each alternative would be examined in light of explosives safety requirements and nine criteria established by the National Contingency Plan. *These criteria are as follows:*

- Overall protection of human health and the environment.
- Compliance with applicable requirements of federal and state law.
- Long-term effectiveness and permanence.
- Reduction in explosives safety hazards, toxicity, mobility, quantity, or volume.
- Short-term effectiveness.
- Implementability (i.e., how feasible it is to implement the option).
- Cost.
- Acceptability to appropriate federal and state officials.
- Community acceptance.

It is important to note that safety is the overriding concern. Before taking any action on a range, an Explosives Safety Plan must be submitted to the DDESB for approval. Consultation with state agencies and public access to information, as well as a formal comment period, would play an important part in decision-making. Restoration Advisory Boards or similar forums would be involved in the process leading to specific range response actions. Because this phase would involve a complex study, it would generally be a long-term action.

Recurring Review

The purpose of Recurring Reviews is to ensure that range response actions continue to ensure explosives safety and protection of human health and the environment. The review would also determine if additional evaluation is required.

The focus of the review would depend upon the original purpose and nature of the response. DOD proposes that the initial recurring review of closed, transferred, and transferring ranges be conducted three years after an Accelerated Response or Site-Specific Response is taken, or as necessary to ensure that the response action is still effective.

Subsequent recurring reviews would be conducted in the seventh year and at five-year intervals thereafter. There would be an immediate review, if an emergency situation is identified. Likewise, regulatory agencies and the public may request further consideration of the effectiveness of the response action outside the recurring review schedule. Consultation with federal and state agencies and the public, public access to information, and a formal comment period, would play an important part in drafting the final report and decision document within this phase.

Range Closeout

Following review to ensure that the range is unlikely to pose further risk, or that the response objectives were achieved, DOD would end the response action. If at some future date a problem is discovered, DOD would address the problem as appropriate. Consultation with federal and state agencies and the public, public access to information, and a formal comment period, would play an important part in this phase.

by: Mr. Mike Cast
Army Environmental Center
DSN 584-1268
COMM (815) 671-1268

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM FOR FORMERLY USED DEFENSE SITES (DERP FUDS)

The U.S. Army Technical Center for Explosives Safety (USATCES), in partnership with the U.S. Army Corps of Engineers (USACE)-Rock Island District, continues support of the U.S. Army Engineering and Support Center, Huntsville (USAESCH) with the assessment and clean-up activities of ordnance and explosives (OE) at FUDS.

Primary support provided by USATCES is development of an Archives Search Report (ASR) for each assigned site. The ASR includes an historical records search (HRS) and review, site inspection (SI), ordnance evaluation, and preparation of a technical report.

An integral part of this process is the HRS and review conducted for each site by a member of the HRS Team. Federal, state, and local government sources plus non-government sources are contacted to obtain information used during SIs and in the preparation of the technical report. Report information includes the following: site history; types of ordnance used at the site; location of ordnance and/or explosives; impact areas; range fans; climate; hydrology; geology; historical and current aerial photographs; site maps; newspaper articles; previous studies; environmental assessments; ownership, including plat maps; records of real estate transactions showing War Department, Navy Department, or Department of Defense (DOD) usage; boring logs; and cultural resources, including endangered species and interviews with knowledgeable persons.

Former installations and locations to be inspected during FY 98 are:

Palo Alto PBR #4, Pima County, AZ
Palo Alto PBR #5, Pima Co., AZ
Palo Alto PBR #6, Santa Cruz Co., AZ
Camp Lamesa, San Diego County, CA
Santa Catalina Island Bombing Area, Santa Catalina Island, CA
Victorville PBR N-3, San Bernardino Co., CA
Victorville PBR No. 3, San Bernardino Co., CA
Victorville PBR No. 4, San Bernardino Co., CA
Victorville PBR No. 5, San Bernardino Co., CA
Victorville PBR No. 6, San Bernardino Co., CA
Victorville PBR No. 9, San Bernardino Co., CA
Victorville PBR No. 10, San Bernardino Co., CA
Victorville PBR No. 11, San Bernardino Co., CA
Victorville PBR No. 12, San Bernardino Co., CA
Victorville PBR No. 14, San Bernardino Co., CA
Victorville PBR No. 15, San Bernardino Co., CA
Victorville PBR No. 16, San Bernardino Co., CA
Victorville PBR No. 19, San Bernardino Co., CA
Baker Target, Baker Co., FL
Campville Glider and Dive-bombing Range, Alachua Co., FL
Longboat Key Bombing and Gunnery Range, Manatee Co., FL
Manning Target, Baker Co., FL
Glynco NAS, Glynn Co., Brunswick, GA
Kennesaw Mountain Artillery Range, Cobb Co., Marietta, GA
Thomasville Bombing and Gunnery Range, Thomas Co., GA
Great Brewster Island Military Reservation, Suffolk Co., Hull, MA
Lakeside Camp, Bristol Co., MA
Natick Plant, Natick, MA
Outer Brewster Island Military Reservation, Suffolk Co., Hull, MA
Scituate Proving Ground, Scituate, MA
Jameson Point Battery, Knox Co., Rockland, ME
Little River Battery, Waldo Co., Belfast, ME
Camp Norrie, Gogebic Co., Ironwood, MI
Naval Air Station Grosse Ile (Nike D-51), Wayne Co., Grosse Ile, MI
Sioux City PBR No. 6, Bon Homme Co., SD; Knox Co., NE
Naval Bombing and Strafing Target, Maurice River Cove, NJ
Fort Niagara, Niagara Co., Youngstown, NY
New York Ordnance Works, Onandaga Co., Lysander, NY
Plattsburgh Atlas S-7, Franklin Co., NY
Stony Point Test Annex, Jefferson Co., Henderson, NY
Lordstown Ordnance Depot, Trumbull Co., Lordstown, OH
Portland Army Air Base, Multnomah Co., OR
Roseburg Rifle Range, Douglas Co., Roseburg, OR
Camp Reynolds, Mercer Co., Greenville, PA
Desecheo Island, PR
Fort Nathaniel Greene Military Reservation, Narragansett, RI
Naval Auxiliary Landing Field, Charleston, RI
Rapid City Air to Ground Gunnery Range, Meade Co., SD
Rapid City Small Arms Range Annex, Meade Co., SD

Anyone having information on these installations is requested to forward materials or suggestions to:

Director
Defense Ammunition Center
ATTN: SIOAC-ESL (Reinhardt)
3700 Army Depot Road
Savanna, IL 61074-9639

By: Mr. Tom Reinhardt,
USATCES
DSN 585-8789
COMM (815) 273-8789

BUILDINGS CONTAMINATED WITH EXPLOSIVES RESIDUES

The Army is converting many former ammunition production and maintenance buildings to other uses. For example, many installations which are closing due to Base Realignment and Closure (BRAC) must shut down their ammunition operations and turn the buildings over to the public.

Before the Army releases these buildings, the installation or another competent party must inspect them to ensure they are free of explosives hazards. Some buildings are easy to inspect; others are not. For example, you'd only need to inspect readily accessible areas in an ammunition shipping building. On the other hand, you'd have to inspect cracks, recesses, and other hidden spaces in a TNT melt pour building.

For guidance on inspection of buildings, you have two places you can call. If you work for Industrial Operations Command (IOC), call Ralph Knape or Jerry Bryan at the IOC Safety Office, (319) 782-2973 or 2983. For guidance outside IOC, call Cliff Doyle or Jean Gallagher at USATCES, (815) 273-8741 or 8876.

by: Mr. Cliff Doyle
USATCES
DSN 585-8741
COMM (815) 273-8741

EXPLOSIVES SOIL

The soil at many current and former DOD sites is contaminated with waste explosives as a result of explosives manufacturing; ammunition load, assemble, and pack (LAP) operations; explosives reclamation; and open burning/open detonation (OB/OD) operations.

This type of contamination presents different problems than unexploded ordnance (UXO) in the dirt. UXO can be located and removed. Waste explosives mixed with soil can't be easily removed. Because this waste is toxic, and may migrate into the groundwater, the contaminated soil must be treated to remove any threat to human health and the environment.

Complicating the cleanup effort is the fact that above certain concentrations, the waste explosives/soil mixture is reactive, and may actually detonate under the right stimulus. Tests done by the Army Environmental Center (AEC) show that for secondary explosives such as TNT and RDX, soils containing more than 12% explosives by weight are susceptible to detonation by flame under confinement, and soils containing more that 15% explosives by weight are susceptible to detonation by shock.

Based on these tests, the Army considers any soil containing more than 10% by weight of secondary explosives to be reactive. Such soil/explosives mixtures must be treated as an explosives when being sampled or treated. These test procedures are detailed in a report numbered AMXTH-TE-CR-86096, "Testing to Determine Relationship Between Explosives Contaminated Sludge Components and Reactivity."

If you're interested in all the details of how the testing was conducted, it's available through the Defense Technical Information Center (DTIC). Your installation technical library should be able to get you a copy. If not, contact our technical library at DSN 585-8771 or commercial (815) 273-8771. A list of the specific explosives tested was published in our June 1995 Explosives Safety Bulletin. Copies are available on request.

Studies on primary explosives such as lead azide or nitroglycerin are being done now by AEC. Preliminary indications are that 5% may be the safety threshold reactivity level for lead azide, and 10% may be the threshold for nitroglycerin. Soils contaminated with any other primary explosives should be considered reactive until testing has established a safety threshold reactivity level.

The currently accepted way to handle explosives soil is to blend it with clean or less contaminated soil until the percentage of explosives is below the reactivity level, then screen it to remove any solid chunks of explosives. At this point, the mixture doesn't have to be handled as

an explosives and the waste explosives can be safely removed by incineration or any of several bioremediation techniques that have recently been successfully tested, such as windrow composting or soil slurry reactor treatment.

by: Mr. James Toburen
USATCES
DSN 585-8784
COMM (815) 273-8784

TECHNICAL ADVISORY GROUP (TAG) FOR ARCHIVES SEARCH REPORTS (ASRs)

The ASR TAG for the Ordnance and Explosives (OE) Program was formally established in July 1994. The TAG has the responsibility for assessing the results of Archives Searches for Formerly Used Defense Sites (FUDS), as well as Base Realignment and Closure (BRAC) sites, and providing a consensus of strategy for subsequent response actions for the sites involved. The TAG is composed of various representatives from different teams and offices at the U.S. Army Engineering and Support Center, Huntsville (USAESCH): OE Safety and Occupational Health Specialist, OE Quality Assurance Specialist (Ammunition Surveillance) (QASAS), OE Project Manager, Engineer from the GEO-TECH Branch of the Engineering Directorate, and OE Recovered Chemical Warfare Materials (RCWM) Team member (if CWM are a consideration). Each representative brings a different area of expertise and point of view to the TAG meetings in helping the TAG achieve a consensus for site strategy.

The review begins when the activity which prepared the draft ASR submits the report, along with a draft fact sheet, to the ASR Manager, Mr. Danny Mardis, at USAESCH. Briefly stated, the purpose of the Archives Search for a FUDS/BRAC site is to assemble historical records and available field data, assess potential ordnance presence, and recommend follow-up actions. The finalized ASR is the written report that includes findings, conclusions, and recommendations. The finalized fact sheet, when completed following the TAG, is a short report which provides ready access to essential information regarding the site: name, site number, project number, description, history, project description, current status, strategy, issues and concerns, schedule summary, and funding/budget summary.

Upon receipt of the draft ASR and draft fact sheet, a safety and technical review is completed. If further action is indicated, a meeting of the TAG is scheduled. Prior to the TAG meeting, an ASR Technical Reviewer is assigned by the ASR Inventory Project Reports (INPR) Team. This person takes the lead in reviewing the draft ASR and review comments, revising the draft fact sheet, and recommending a strategy for the TAG to discuss at the meeting. The ASR Technical Reviewer forwards the revised fact sheet, which includes rationale and justification for the site strategy, to TAG members before the TAG meeting.

At the TAG meeting, the ASR Technical Reviewer presents the documentation pertaining to the site. The function of the TAG is to review the revised fact sheet, the draft ASR, if necessary, and review comments; to discuss the options available; and to agree on a strategy for further action to be taken for that site. TAG findings, strategy, and consensus are incorporated into the ASR, and at that point, the ASR is finalized. Following the TAG meeting, the ASR Technical Reviewer finalizes the fact sheet to reflect the consensus of the TAG to include a justification for further actions and a cost estimate. This is the final product of the TAG. In conclusion, the ASR Manager coordinates with the OE Program Manager to get the project onto the correct fiscal year work plan.

Since the beginning of FY 97, Messrs. Fred Girard and Tom Meekma, personnel from USATCES with extensive prior experience in the archival search process, have been contributing directly to the success of the TAG at USAESCH. These individuals, as defacto members of the USAESCH ASR/INPR Team, have been conducting technical reviews of FUDS ASRs, fact sheets and comments; revising fact sheets, devising strategies for sites, and providing supporting justifications; presenting site documentation to the TAG at USAESCH; and finalizing fact sheets to reflect the consensus of the TAG. Through the end of FY 97, USATCES had received 147 ASRs: 121 had been presented to the TAG and 17 were ready for presentation at the next scheduled TAG. The workload balance consisted of the remaining nine ASRs. This one aspect of partnership between USAESCH and the Defense Ammunition Center (DAC) is expected to continue through FY 98.

by: Mr. Tom Meekma
USATCES
DSN 585-8739
COMM (815) 273-873

WHY QASAS AT HNC?

In the World of ordnance, Huntsville Center is known for its specialized expertise. One element of that expertise includes two employees who carry the word QASAS after their job titles--no matter where they're assigned, and they've been assigned all around the world.

Richard Pike and John Sikes are Quality Assurance Specialists (Ammunition Surveillance)--commonly known as QASAS (pronounced KWA-SUS).

To be a QASAS means you've received extensive training in the life cycle of the ammunition stockpile--from cradle to grave. It means being a munitions expert in the truest sense of the word on *all* munitions--chemical and special weapons, as well as conventional. It means working in ammo manufacturing plants, on Army storage depots, in the field with soldiers, at port facilities where prepositioned ammo ships dock, and, because of Huntsville Center's unique ordnance mission, it means a rare assignment here with the Corps of Engineers.

Armed with an in-depth knowledge of ammunition and all the processes that surround the manufacturing, movement, storage, and disposal of ammo, the QASAS expertise seems a perfect fit with the Huntsville Center mission.

Bob Nore, Chief of the Ordnance and Explosives Design Center, agrees. "I have found the QASAS folks to be highly qualified for this kind of work. Their quality assurance background has been very helpful in establishing work procedures and in setting the direction of our quality assurance policies. Both John and Richard have been an important part of our OE Team," he said.

For example, as the team leader for the Archive Search Reports/Inventory Project Reports Team, Pike reviews detailed search reports on formerly used defense sites. Those reports, prepared by St. Louis and Rock Island districts, are the basis for making critical decisions on ordnance cleanup strategies. Pike's QASAS background ensures that even the smallest detail, such as how typical ammo production lines worked during World War II, is given full consideration in the final analysis of the data. Once the review of the reports is finished, a recommendation on cleanup strategy goes to the Huntsville Center Technical Advisory Group, of which Pike is also a member.

As an OE project manager for the cleanup of formerly used defense sites during 1994-1996, one of Pike's projects was the Toussaint River Dredging Demonstration on lake Erie. That project was a demonstration to determine if it was feasible to dredge a channel that was contaminated with unexploded ordnance. The equipment and procedures used were such a new innovative technology that Pike wrote a paper on the project and presented it at the 1996 Global Demilitarization Symposium and Exhibition in Reno, Nevada; the AMEREM '96 International Conference in Albuquerque, NM, and the DoD Explosives Safety Seminar at Las Vegas, NV.

Sikes plays a much different role at Huntsville Center. He is developing an ISO 9000-equivalent Quality Operating System that documents the processes currently used within the OE Center of Expertise and Design Center. ISO 9000 is an internationally recognized set of quality standards. As Sikes puts it, "a way to do good business." He explained that through the process, you "document what you do; do what you document; and then evaluate and improve the process." According to Sikes, the documentation of OE quality processes will provide the mechanism for continuous improvement by defining a corrective action process, a preventive action process, and the sharing of lessons learned.

Both Sikes and Pike agree that one thing they both bring to Huntsville Center is an impressive access to resources throughout the services. "We personally know people in almost every relevant area who we could call and get answers or information in a matter of minutes," said Pike.

The Defense Ammunition Center (DAC) in Savanna, IL, is home to the career program manager's office for all QASAS. DAC rotates QASAS employees in and out of assigned slots throughout the Army. Pike and Sikes came to Huntsville as "loaned" QASAS in 1994. Sikes' job in quality assurance in the Center of Expertise is a permanent QASAS slot. Pike is still considered "on loan;" however, the position should be made permanent soon.

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CERTIPAKS

Certipaks were developed to verify that explosively contaminated material was decontaminated to 5X standards. They were used to confirm the destruction of explosive contaminants when operating buildings at Alabama Army Ammunition Plant (ALAAP) were burned down.

A Certipak consists of a porous ceramic bead wrapped in a steel foil envelope with a stainless steel retrieving wire attached. The bead is impregnated with a known concentration of the appropriate explosives (usually TNT). The Certipaks are strategically placed in various locations among the items being decontaminated. This includes areas where a high level of contamination is expected and suspected cold spots.

The material being decontaminated is heated for at least one hour to 300 degrees C, which is the upper level of the ignition temperature range for TNT. (TNT has a higher ignition temperature than either HMX or RDX.) The ignition temperature is the lowest temperature at

which combustion begins and continues when a substance is heated in air. At the end of the process, the beads are tested to see if any explosives remains. If the test is positive, the decontamination process is repeated. If it is negative, decomposition of the contaminant is verified.

by: Ms. Jean Gallagher
USATCES
DSN 585-8876
COMM (815) 273-8876

BARRICADES FOR UNEXPLODED ORDNANCE (UXO) OPERATIONS

Barricades can be used during UXO removal operations to reduce the fragmentation distance required. They do this by capturing the primary fragments from an accidental explosion and reducing the distances that hazardous fragments are thrown. However, the barricades do not mitigate the effects from blast overpressure. U.S. Army Engineering and Support Center, Huntsville (USAESCH) has developed a guide for the design, construction, and siting of these barricades.

This is a living document and users must ensure that they are using the most up-to-date version of the document. It is available on their web page at http://w2.hnd.usace.army.mil/oew/tech/baricade.html.

by: Ms. Jean Gallagher
USATCES
DSN 585-8876
COMM (815) 273-8876

DETERMINING THE RISK ASSESSMENT CODE (RAC)

During the preliminary assessment of a potential ordnance project site, the geographic Corps district generates the risk assessment procedures. Through those procedures, site investigators determine the RAC score for each site.

In accordance with MIL-STD 882C and AR 385-10, the RAC score is used by the U.S. Army Engineering and Support Center, Huntsville (USAESCH) to prioritize response actions at formerly used defense sites (FUDS). The score is based on information from records searches, reports from explosive ordnance disposal (EOD) units and local law enforcement agencies, interviews, and field observations from the preliminary assessment phase. RAC information is used to assess risk, based upon *potential* ordnance and explosives (OE) hazards identified at the site.

The RAC score is composed of two factors: hazard severity, which indicates the level of damage, and hazard probability, which indicates the potential for exposure.

The hazard severity value is a qualitative measure of the worst credible mishap from exposure to various types and quantities of unexploded ordnance (UXO). The higher the value, the more severe the potential mishap. For example, an unexploded bomb carries a hazard severity value of 10, while a round of small arms ammunition (SAA) carries a value of 1. The value is based on the site's history for each type of munition. The total hazard severity value, then, is the sum of all suspected hazards on a site. That total is used to rank severity within four categories, I through IV, "I" being the most severe.

The hazard probability value indicates the likelihood that a hazard will be created by the presence of ordnance and other factors regarding the ordnance. The higher the value, the greater the likelihood of a mishap. For example, surface ordnance carries a value of 5, while subsurface ordnance carries a value of 2. The total hazard probability level is the sum of all hazard probability values for a site. That total is used to rank probability within five categories, A through E, "A" being the most probable.

After both hazard values are calculated, total hazard probability is then plotted against total hazard severity to determine the final RAC. All RAC 1 sites are then ranked within each RAC band to prioritize sites for funding.

The RAC is required for all inventory project reports, including sites with no further action, thus providing a permanent record to satisfy congressional intent that a conscientious effort has been made to determine the presence or absence of ordnance.

The risk assessment procedures are outlined in appendix B of draft ETL 1110-1-165, *Procedures for Conducting Preliminary Assessments at Potential Ordnance Response Sites*, which is available on the OE website.

by: Bill McPherson and
Richard Pike
U.S. Army Engineering and
Support Center, Huntsville
DSN 760-1595
DSN 760-1559

DEPARTMENT OF THE ARMY
U.S. ARMY TECHNICAL CENTER FOR EXPLOSIVES SAFETY
SAVANNA, ILLINOIS 61074-9639
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USATCES Organizational Information

Office of the Director/Associate Director

DSN	585-8919
Commercial	(815) 273-8919
Datafax DSN	585-8769
Datafax Commercial	(815) 273-8769
Email	sioac-es@dac-emh1.army.mil

Ordnance Explosives Environmental Division

DSN	585-8801
Commercial	(815) 273-8801
Datafax DSN	585-6056
Datafax Commercial	(815) 273-6056
Email	sioac-es1@dac-emh1.army.mil

Explosives Safety Test Management Division

DSN	585-8756
Commercial	(815) 273-8756
Datafax DSN	585-8503
Datafax Commercial	(815) 273-8503
Email	sioac-est@dac-emh1.army.mil

Program Management and Data Division

DSN	585-8745
Commercial	(815) 273-8745
Email	sioac-esm@dac-emh1.army.mil

Explosives Safety Technical Library

DSN	585-8771
Commercial	(815) 273-8771
Datafax DSN	585-8705
Datafax Commercial	(815) 273-8705
Email	sioac-esm@dac-emh1.army.mil

Hotline

DSN	585-6030
Commercial	(815) 273-6030